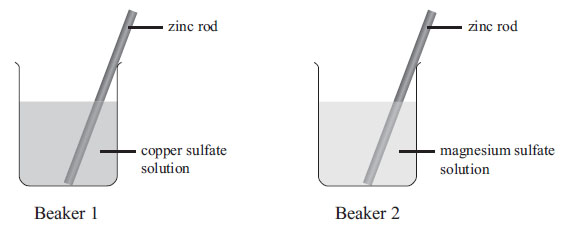
**Displacement**

**1)** A zinc rod was placed in a solution of copper sulfate, and another zinc rod was placed in a solution of magnesium sulfate. Both were left for one week.

****

Describe any observations that would be made for each beaker.

Identify the type of reaction that is occurring above.

Explain any difference in the observations made in Beaker 1 and Beaker 2 by linking your observations to the type of reaction occurring, and the reactants and products involved.

Write ONE balanced ionic equation for a reaction from (a).

In the laboratory the teacher made impure lead crystals by placing a metal in lead nitrate solution.

(i) Choose a suitable metal for this reaction and justify your choice.

(ii) Write a balanced ionic equation for the reaction you have chosen above.

2) A spotting tile was set up, as shown in the diagram below, to investigate the reaction of small pieces of cleaned metals with a small volume of different metal nitrate solutions.

|  |  |
| --- | --- |
|  |  |

Complete the table below to identify which reactions will occur. The first two lines have been completed for you.

You may refer to the activity series in the resource booklet.

(b) Identify the type of reaction that is occurring on the spotting tile, and justify your choice

In your answer:

 identify the reaction you have selected

 describe any observations that would be made in the selected reaction, and link your observations to the reactants and

products involved in the reaction

 identify the type of reaction occurring, and justify your choice

 write a balanced symbol equation for your reaction.

Explain why magnesium nitrate solution does not react with any of the three metals zinc, copper and lead.

You may refer to the activity series in the resource booklet.

3) An experiment in the laboratory involves placing an iron nail in copper sulfate (CuSO4) solution and a copper nail in iron(II) sulfate (FeSO4) solution.

Both nails are cleaned with sandpaper, placed in each solution, and the test tubes are stoppered and left overnight.



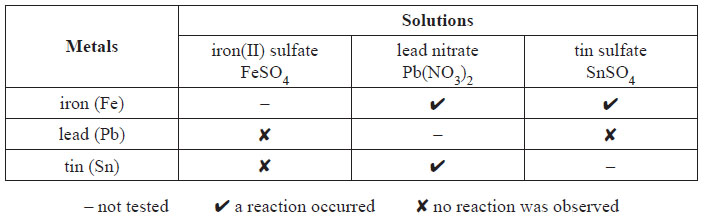
(a) Describe any observations that would be made the next day.

(b) (i) Identify the type of reaction that occurs and give a reason for your choice. You may refer to the activity series

provided in the resource booklet.

(ii) Write a balanced **ionic** equation for ONE reaction that occurs.

Cleaned pieces of the metals iron (Fe), lead (Pb) and tin (Sn) were placed in solutions of iron(II) sulfate (FeSO4), lead nitrate (Pb(NO3)2) and tin sulfate (SnSO4), as shown in the table below:



Use the information provided in the table to place tin (Sn) in the activity series. Explain your answer.

You may refer to the activity series provided in the resource booklet.

4) A piece of copper wire placed in a solution of silver nitrate undergoes a displacement reaction.

Give a detailed account of this reaction. You may refer to the Activity series in the Resource Booklet.

In your answer you should:

  describe any observations that would be made

  link these observations to the chemical species involved

  explain why the displacement reaction occurs

  write a balanced **ionic** equation for this reaction.

**5)** A clean iron nail placed in a solution of copper (II) sulfate undergoes a displacement reaction over a period of time.

Discuss the chemistry of this displacement reaction. In your answer, you should:

describe the physical changes that would occur

relate each change to the chemical(s) involved

fully explain why the displacement reaction occurs

write a balanced **ionic** equation for the reaction.

**6)**



**7)** Some grey powdered magnesium was added to a green solution of iron (II) sulfate in a beaker, and mixed well. The green colour of the solution faded and the grey powder disappeared. A new dark grey solid formed on the bottom of the beaker.

(i) State what type of reaction this is.

(ii) Discuss what happened in this reaction. Your answer should link the reactants and products involved in the reaction to the observations made.

Include an appropriate balanced equation in your answer. Spectator ions may be omitted.

**8)**



**9)**  A piece of zinc foil is added to copper (II) nitrate solution and left. It is checked after 10 minutes and then again after 24 hours.

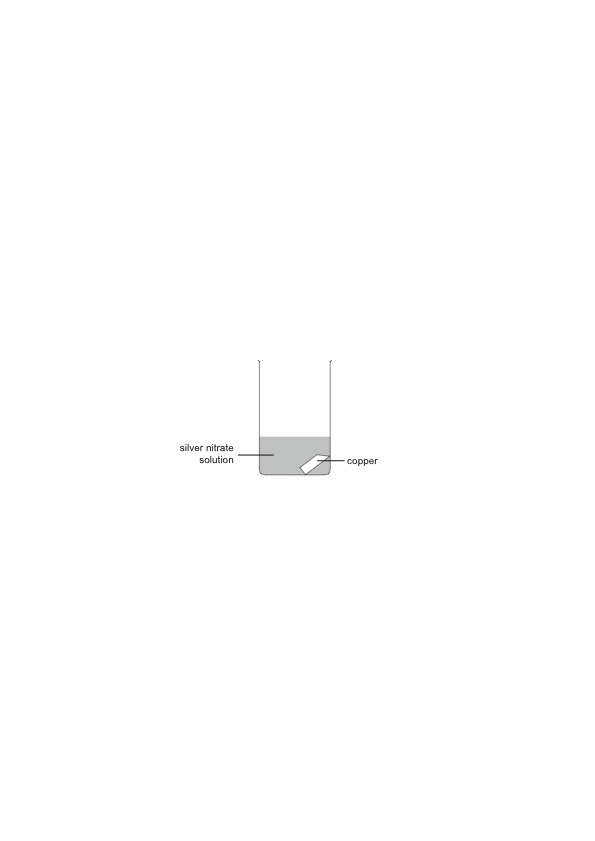
(i) Describe ONE observation that you would expect to make after 10 minutes.

(ii) Describe a **different** observation that you would expect to make after 24 hours.

(iii) Explain why BOTH of your observations above have occurred.

(iv) Write a balanced equation for this reaction. Spectator ions may be omitted.

**10)** A piece of **copper** is placed in a solution of **silver nitrate**.



(i) Describe TWO observations that would be made.

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